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EXAMINER	
LEUNG, JENNIFER A	

ART UNIT	PAPER NUMBER
1764	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/553,990	XU ET AL.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 January 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6-11,14-27,29-35,38-40 and 49-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-11,14-27,29-35,38-40 and 49-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment submitted on January 14, 2005 has been received and carefully considered. Claims 4, 5, 12, 13, 28, 36, 37 and 41-48 are cancelled. Claims 49-58 are newly added. Claims 1-3, 6-11, 14-27, 29-35, 38-40 and 49-58 remain active.

Claim Objections

2. Claims 27, 33, 35, 50 and 51 are objected to because of the following informalities:

In claim 27, "a prelift zone" in line 6 should be changed to --the prelift zone--.

In claim 33, "a first reaction zone" in lines 15 and 17 should be changed to --the first reaction zone--. Also, "a first reaction zone diameter" in line 17 should be changed to --the first reaction zone diameter--.

In claim 35, "a prelift zone" in line 6 should be changed to --the prelift zone--.

In claim 50, the Examiner suggest changing the phrase "at least one member" to --at least one medium--, because various medium are listed in the Markush group.

In claim 51, it is unclear as to where the quench mediums of "LCCO" and "HCCO" should be changed to --LCO-- and --HCO--, respectively, for consistency with the specification (see page 6, lines 5-7).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-3, 6-8, 25-27, 29-35, 38-40 and 49-58 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 1, it is unclear as to where the newly added limitation of the prelift zone being, "adapted to lift catalytic cracking catalyst to a first reaction zone *without cracking hydrocarbons* in that prelift zone" (lines 5-7) finds support in the disclosure.

Regarding claim 25, it is unclear as to where the newly added limitation of using the prelift zone, "to transport the catalytic cracking catalyst to the first reaction zone *without reacting a hydrocarbon* in the prelift zone" (lines 4-7) finds support in the disclosure.

Regarding claim 33, it is unclear as to where the newly added limitation of using the prelift zone, "to transport the catalytic cracking catalyst to the first reaction zone *without reacting hydrocarbon* in the prelift zone" (lines 7-9) finds support in the disclosure.

Regarding claim 57, it is unclear as to where the newly added limitation of, "a heat exchanger between the first reaction zone and the second reaction zone adapted to cool at least a portion of hydrocarbon and catalyst passing between the first reaction zone and the second reaction zone" finds support in the disclosure. For instance, page 5, lines 13-27, discloses a "heat exchanger" or "heat remover" may be provided in the second reaction zone; however, there is no disclosure of a heat exchanger located between the first and second reaction zones.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-3, 6-8, 14, 16, 25-27, 29-35, 38-40 and 49-58 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, it is unclear as to the additional, positive, structural limitation applicant is attempting to recite for the prelift zone in the limitation, "adapted to lift catalytic cracking catalyst to a first reaction zone without cracking hydrocarbons in that prelift zone" in lines 6-7, because such limitation is a functional limitation that provides no further structure to the claim. It has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. Also, it is unclear as to the relationship between the "catalytic cracking catalyst" in line 9 and the "catalytic cracking catalyst" in lines 5-7. Also, it is unclear as to the relationship between the "catalytic cracking catalyst" in line 16 and either the "catalytic cracking catalyst" in lines 5-7 or lines 8-13. Also, "the next reaction zone having an iso-diameter" in lines 14-15 lacks proper positive antecedent basis. Also, it is unclear as to the additional, positive, structural limitation applicant is attempting to recite for the first reaction zone in the limitation, "adapted to accept pre-lifted catalytic cracking catalyst from the prelift zone and to react a hydrocarbon in the first reaction zone" in lines 9-11, because such limitation is a functional limitation that provides no further structure to the claim. Also, it is unclear as to the additional, positive, structural limitation applicant is attempting to recite for the second reaction zone in the limitation, "adapted to accept catalytic cracking catalyst and reacted hydrocarbons from the first reaction zone," in lines 16-17, because such limitation is a functional limitation that provides no further structure to the claim.

Regarding claim 6, it is unclear as to the structural limitation applicant is attempting to recite by, "comprising said outlet zone... and the height of said optional outlet zone is from about 0% to about 20% of the height of the riser reactor," because the limitation is contradictory in that it is unclear as to whether the outlet zone is included in the reactor.

Regarding claim 14, it is unclear as to the relationship of "an outlet zone" in line 1 and "an outlet zone" set forth in claim 9, line 22. Furthermore, it is unclear as to the structural limitation applicant is attempting to recite by, "comprising an outlet zone... and the height of said outlet zone is from about 0% to about 20% of the height of the riser reactor", because the limitation is contradictory in that it is unclear as to whether the outlet zone is included or not included in the reactor (i.e., in the case of a height of 0%).

Regarding claim 16, it is unclear as to the relationship of "an outlet zone" in line 1 and "an outlet zone" set forth in claim 9, line 22.

Regarding claims 26, 27 and 29-32, lines 1-2, the step of "providing the reactor system" lacks proper positive antecedent basis, since the step of "providing the *riser reactor*" is set forth in claim 25, line 3. Furthermore, it is unclear as to the structural relationship of "a reactor system" to the other elements of the apparatus.

Regarding claim 29, it is unclear as to the structural limitation applicant is attempting to recite by, "and wherein the step of passing the first reaction zone stream from the first reaction zone to the second reaction zone and wherein the step of wherein," in lines 5-6, because it appears that the limitation is incomplete. Additionally, it is unclear as to the additional structural limitations applicant is attempting to recite, because the reactor limitations have already been incorporated into claim 1.

Regarding claim 30, it is unclear as to the structural limitation applicant is attempting to recite by, "comprising the outlet zone... and the height of said optional outlet zone is from about 0% to about 20% of the height of the riser reactor," in lines 2-5, because the limitation is contradictory in that it is unclear as to whether the outlet zone is included in the reactor.

Regarding claim 33, it is unclear as to the structural limitation applicant is attempting to recite by, "and wherein the step of passing the first reaction zone stream from the first reaction zone to the second reaction zone and wherein the step of wherein," in lines 29-30, because it appears that the limitation is incomplete. Furthermore, "the optional outlet zone" in lines 38-39 lacks proper positive antecedent basis (see claim 9, lines 22-23).

Regarding claims 34, 35 and 38-40, lines 1-2, the step of "providing the reactor system" lacks proper positive antecedent basis, since the step of "providing the *riser reactor*" is set forth in claim 33, line 6. Furthermore, it is unclear as to the structural relationship of "a reactor system" to the other elements of the apparatus.

Regarding claim 55, it is unclear as to the relationship between "an outlet zone" in line 1 and "an optional outlet zone" set forth in claim 1, line 21.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 17 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Skraba (US 4,681,743).

Regarding claim 17, Skraba (FIG. 1, 2; TABLE in column 8; column 4, line 58 to column 5, line 21) discloses a riser reactor **4** having a substantially vertical linear axis, a riser reactor height, and a reactor bottom, said reactor comprising, in order from the bottom,

a) a prelift zone (i.e., lift pot **37**; FIG. 2) having a prelift zone diameter and a prelift zone height (see TABLE, line (50));

b) a first reaction zone (i.e., first generally cylindrical portion **82**) having a first reaction zone diameter and a first reaction zone height (see TABLE, line (4)(a)); wherein said first reaction zone **82** contains a cracking catalyst (i.e., supplied from prelift zone **37**) for conducting a hydrocarbon cracking reaction (i.e., on a oil feedstock supplied by line **44**);

c) a second reaction zone (i.e., second generally cylindrical portion **84**) having a second reaction zone height and a second reaction zone diameter (FIG. 1, 2 and TABLE, lines (4)(a), (c)) and containing cracking catalyst for conducting a hydrocarbon cracking reaction (i.e., supplied from the first reaction zone **82**); wherein the ratio of the second reaction zone **84** diameter to the first reaction zone **82** diameter is in the range of from about 1.5:1 to about 5:1 (i.e., "the diameter of the second generally cylindrical portion of the riser will be in the range of from *about 1.1 to about 2 times* the diameter of the riser at the mouth," column 5, lines 18-21).

Regarding claim 18, Skraba discloses an exemplary commercial catalytic cracker (see TABLE, column 8) wherein the total height of the prelift zone **37** (i.e., about 72 in.), first reaction zone **82** (i.e., about 4 ft.) and second reaction zone **84** (i.e., about 103 ft., 9 in.) in the riser reactor **4** (i.e., without an optional outlet zone) is within the range of about 10 to about 60 meters (i.e., calculates to a total height of about 114 feet, or 35 meters).

Instant claims 17 and 18 structurally read on the apparatus of Skraba.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1-3, 6, 7, 9-11, 14, 15, 17-23, 25-27, 29-31, 33-35, 38, 39, 49-51 and 54-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kmecak et al. (EP 0 171 460) in view of Williams (US 4,422,925).

Regarding claims 1, 17, 20, 21, 25 and 29, Kmecak et al. (see FIG. 8; generally, page 38, line 13 to page 41, line 20) discloses a riser reactor and a corresponding process of conducting a hydrocarbon cracking reaction in the riser reactor, wherein the riser reactor (i.e., including portions **1** and **2**), having a riser reactor height and a reactor bottom, comprises, in order from the reactor bottom,

a) a prelift zone (i.e., the restricted diameter portion of the riser **1**, located between the lift gas inlet conduit **4** and the charge oil inlet conduit **5**) having a prelift zone diameter and a prelift zone height and containing catalyst cracking catalyst (i.e., a cracking catalyst, introduced in regenerated form via conduit **3**; page 43, lines 7-26; also, page 14, line 3 to page 17, line 23), the prelift zone being adapted to lift the catalyst to a first reaction zone (i.e., located immediately downstream from inlet **5**) without cracking hydrocarbons in that prelift zone (i.e., the lift gas to the inlet conduit **4** for contacting the regenerated catalyst is a dry hydrogen containing gas, optionally supplemented with steam and/or water, and most preferably containing about 0-6% C3-plus hydrocarbons. Such contact is conducted prior to contacting the regenerated catalyst with heavy oil feed supplied via conduit **5** to be cracked. See page 28, lines 9-25; page 44, line 12 to page 46, line 2);

b) the first reaction zone (i.e., the restricted diameter portion of the riser **1**, located between the charge oil inlet conduit **5** and the frusto-conical transition section to portion **2**, not labeled) having a constant first reaction zone diameter and a first reaction zone height, the first reaction zone containing catalytic cracking catalyst lifted from the prelift zone and reacting a hydrocarbon (i.e., received from the charge oil inlet **5**) in the first reaction zone; and

c) a second reaction zone (i.e., the expanded or larger diameter portion of the riser **2**) having a second reaction zone diameter that is larger than the first reaction zone diameter and containing catalytic cracking catalyst and reacted hydrocarbons from the first reaction zone.

The prelift zone (i.e., riser **1**, between inlets **4** and **5**) and first reaction zone (i.e., riser **1**, between inlet **5** and the transition) are defined by the same riser reactor portion **1**, and therefore, the ratio of the first reaction zone diameter to the prelift zone diameter is approximately 1:1. Additionally, FIG. 8 clearly shows the second reaction zone **2** diameter being larger than the first reaction zone **1** diameter. In making a rough estimate of the zone diameters using FIG. 8, it would appear to one of ordinary skill in the art that the ratio of the second zone diameter to the first zone diameter is about 3:1. Kmecak et al., however, is silent as to the ratio of the second reaction zone **2** diameter to the first reaction zone **1** diameter being, specifically, in the range of from about 1.5:1 to about 5:1.

Also, in making a rough estimate of the zone heights using FIG. 8, it would appear to one of ordinary skill in the art that the height of the first reaction zone **1**, between inlet **5** and the transition, is about 30% the height of the riser reactor, and the height of second reaction zone **2** is about 50% of the height of the riser reactor. Kmecak et al., however, is further silent as to the height of the first reaction zone being, specifically, from about 10% to about 30% of the height

of the riser reactor, and the height of the second reaction zone **2** being, specifically, in the range of from about 30% to about 60% of the height of the riser reactor.

In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select the recited dimensions for each of the prelift zone, the first reaction zone and the second reaction zone in the riser reactor of Kmecak et al., on the basis of suitability for the intended use, because changes in size merely involves routine skill in the art, *In re Rose*, 220 F.2d 459, 463, 105 USPQ 237, 240 (CCPA 1955). Additionally, the precise dimensions of the respective zones of the riser reactor would have been considered a result effective variable by one having ordinary skill in the art, as evidenced by Williams. In particular, Williams et al. (column 4, lines 21-29) teaches a riser reactor wherein,

> "In each of the reactor sections **9**, **10**, **11** and **12**, reaction conditions suitable for substantially optimum conversion of the various hydrocarbon feedstreams introduced into the successive sections of the riser reactor to the desired products may be obtained by variations in vapor velocity, catalyst loading, feed preheats, and regenerator temperature. *The length and diameter of the various sections of reactor 2 are proportioned to maintain a desired reaction time in each section.*"

Accordingly, one having ordinary skill in the art would have routinely optimized the length and diameter of the various zones of the riser in the apparatus and process of Kmecak et al. in order to obtain the desired reaction conditions within each zone for achieving an optimum conversion of a specified hydrocarbon feed, *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980), and where the general conditions of a claim are disclosed in the prior art, discovering optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claims 2, 18 and 26, Kmecak et al discloses the riser reactor may comprise a vertical length of about 49 meters, or about 160 feet (page 49, lines 7-23). Additionally, Kmecak

et al. discloses, "The riser reactor may be substantially any desired vertical length which will be compatible with the adjacent catalyst regeneration apparatus..." (page 41, lines 15-20).

Regarding claims 3, 19 and 27, in making a rough estimate of the prelift zone height using FIG. 8, it would appear to one of ordinary skill in the art that the prelift zone **1** height, between inlet conduits **4** and **5**, is about 10% of the height of the riser reactor. Kmecak, however, is silent as to the prelift zone height being, specifically, from about 5% to about 10% of the height of the reactor. Kmecak et al. is also silent as to the diameter of the prelift zone being in the range of about 0.02 m to about 5 m. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select appropriate dimensions for the prelift zone in the riser reactor of Kmecak et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the precise dimensions would have been considered result effective variables by one having ordinary skill in the art, as evidenced by Williams et al (see above). Accordingly, one having ordinary skill in the art would have routinely optimized the diameter and height of the prelift zone relative to the dimensions of the riser reactor in the apparatus and process of Kmecak et al. in order to obtain the desired reaction conditions and reaction time within the system for achieving an optimum conversion of a specified hydrocarbon feedstream, *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980), and it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claims 6, 22 and 30, Kmecak et al. discloses an outlet zone having a height of 0% of the riser reactor height. Thus, a specific diameter for the outlet zone is not applicable.

Regarding claims 7, 23 and 31, Kmecak et al. further discloses a first junction section (i.e., the frusto-conical transition zone, not labeled, see FIG. 8) between the first reaction zone (i.e., the riser **1** portion, above inlet **5**) and the second reaction zone (i.e., riser **2** portion), wherein the first junction section forms a circular truncated cone shape. Kmecak, however, is silent as to the first junction section having a "vertical section vertex angle" in the range of about 30° to 80°. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate vertex angle for the first junction section in the apparatus and process of Kmecak et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the precise angle would have been considered result effective variable by one having ordinary skill in the art. Accordingly, one having ordinary skill in the art would have routinely optimized the vertex angle of the first junction section relative to the dimensions of the first and second reaction zones in the apparatus and process of Kmecak et al., in order to obtain the desired reaction conditions and reaction time within the system for achieving substantially optimum conversion of a specified hydrocarbon feedstream, *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980), and it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claims 9, 14, 33 and 38, the same comments with respect to Kmecak et al. and Williams et al. apply. Kmecak et al. further discloses an outlet zone having a height of 0% of the riser reactor height. Thus, a specific diameter for the outlet zone is not applicable. Furthermore, the first reaction zone of Kmecak et al. will be inherently capable of being configured so that a hydrocarbon cracking reaction takes place at a higher reaction temperature, higher ratio of

catalyst to oil, and shorter reaction time than, respectively, a reaction temperature, ratio of catalyst to oil, and a reaction time of the second reaction zone, by virtue of the placement of the feedstock inlet 5, catalyst inlet **3**, the relative reaction zone heights, and enlarged second reaction zone **2** diameter with respect to the first reaction zone **1** diameter (see FIG. 8).

Regarding claims 10 and 34, the same comments with respect to Kmecak et al. apply. (see comments made regarding claims 2, 18 and 26 above).

Regarding claims 11 and 35, the same comments with respect to Kmecak et al. and Williams et al. apply. (see comments made regarding claims 3, 19 and 27 above).

Regarding claims 15 and 39, the same comments with respect to Kmecak et al. apply. (see comments made regarding claims 7, 23 and 31 above)

Regarding claims 49-51, 56 and 57, Kmecak et al. further discloses a conduit (i.e., inlet **7** or **8**; FIG. 8) adapted to supply a quenching medium or a reactable feedstock (i.e., residual oil feed via inlet 7; steam and/or water introduced as diluent via inlet **8**; page 40, line 1 to page 41, line 6) between the first reaction zone (i.e., the riser **1** portion, between inlet **5** and the transition) and the second reaction zone (i.e., the riser **2** portion). The quenching medium inlet inherently functions as a heat exchanger between the first reaction zone **1** and the second reaction zone **2**, for cooling at least a portion of hydrocarbon and catalyst passing between the two zones.

Regarding claim 54, Kmecak et al. further discloses a conjunct zone (i.e., the frusto-conical transition zone, not labeled, see FIG. 8) between the first reaction zone (i.e., the riser **1** portion, above inlet **5**) and the second reaction zone (i.e., riser **2** portion).

Regarding claim 55, Kmecak et al. further discloses a conduit (i.e., inlet **9** or **10**; FIG. 8). adapted to introduce quenching medium (i.e., residual oil feed via inlet **9**; steam and/or water

introduced as diluent via inlet **10**; page 40, line 1 to page 41, line 6) between the second reaction zone **2** and the outlet zone.

7. Claims 8, 16, 24, 32 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kmecak et al. (EP 0 171 460) in view of Williams (US 4,422,925), as applied to claims 1, 9, 17, 25 and 33 above, and further in view of Watts (US 2,377,657).

Kmecak et al. is silent as to the riser reactor being configured with an outlet zone and a second junction section located between the second reaction zone **2** and the outlet zone, wherein the second junction section has a circular truncated cone shape. Watts (see FIG. 1) teaches a riser reactor **11** comprising an outlet zone (i.e., the upper narrowed portion of reactor **11**) and a conjunct section (i.e., labeled as false head **16'**) located between the outlet zone and a reaction zone, wherein the outlet zone has a circular truncated cone shape (page 2, column 2, lines 49-66). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the riser reactor of Kmecak et al. to comprise an outlet zone and second junction zone, on the basis of suitability for the intended use thereof, because, "When the diameter of the reactor is narrowed at its upper end and a false head **16'** is adjustably supported therein, the effective volume of the catalyst chamber, i.e., the dense phase catalyst level therein may be easily controlled," as taught by Watts. Although the collective teachings of Kmecak, Williams and Watts are silent as to the second junction section having a vertical section vertex angle with respect to the reactor axis in the range of about 45 to 80 degrees, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate vertex angle for the second junction section in the modified apparatus and process of Kmecak et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof,

because the precise angle would have been considered result effective variable by one having ordinary skill in the art. Accordingly, one having ordinary skill in the art would have routinely optimized the vertex angle of the first junction section relative to the dimensions of the first and second reaction zones in the modified apparatus and process of Kmecak et al., in order to obtain the desired reaction conditions and reaction time within the system for achieving substantially optimum conversion of a specified hydrocarbon feedstream, *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980), and it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

8. Claims 52, 53 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kmecak et al. (EP 0 171 460) in view of Williams (US 4,422,925), as applied to claim 1 above, and further in view of Carr et al. (US 3,639,228).

Kmecak et al. is silent as to the quench medium comprising catalyst (e.g., regenerated catalyst with a residual carbon content of less than about 0.1 wt%, semi-regenerated catalyst having a residual carbon content of at least 0.1 wt% to about 0.9 wt%, or fresh catalyst). Carr (FIG. 1) teaches the introduction of catalyst at various locations (i.e., via catalyst pipes **18** and **20**) downstream from the inlet of the reactor (i.e., adjacent catalyst inlet **16**). The catalyst may comprise regenerated or semi-regenerated catalyst (i.e., regenerated catalyst with a level of carbon on the regenerated catalyst from about 0.05 to 0.3 percent by weight; column 5, lines 34-59), as well as fresh catalyst (i.e., supplied via make-up catalyst line **66**). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a quenching medium comprising catalyst to the riser reactor in the modified apparatus of Kmecak

et al., on the basis of suitability for the intended use thereof, because the downstream injection of additional catalyst increases the yield and selectivity of the cracking reaction within the riser reactor by shifting a major portion of the cracking reaction away from the inlet end of the reactor and thereby distributing the cracking reaction over the length of the riser rather than concentrating the reaction at the inlet of the riser, as taught by Carr et al. (column 1, lines 33-73).

Response to Arguments

9. The rejection of claims 17 and 18 under 35 U.S.C. 102(b) as being anticipated by Skraba (US 4,681,743) is maintained. Applicant's arguments have been fully considered but they are not persuasive. Beginning on page 19, second to last paragraph, Applicant argues,

> "... each of the independent claims requires first and second reaction zones resulting in a first reaction zone diameter that is between 1.1 and about 2.1 of the ratio between the first reaction zone diameter and the prelift zone diameter. Further still, the height of the first reaction zone is to be about 10% to about 30% of the height of the riser reactor. Further, the ratio of the second reaction zone diameter to the first reaction zone diameter is in a range between 1.5:1 and about 5:1 and the second reaction zone height falls in a range of about 30% to about 60% of the height of the riser reactor. The Skraba patent does not show this combination of reactor size parameters."
>
> "In particular, the portion of the Skraba reactor identified as the prelift zone in the Office Action, is larger in diameter than is the first reaction zone diameter. This situation is clearly not permitted by Applicants' claims."

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the specific reactor size parameters, e.g., the ratio between the first reaction zone diameter and the prelift zone diameter) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Sharp et al. (US 3,246,960) is present to illustrate the state of the art. In particular, FIG. 4 shows a conventional riser reactor (shown on the right hand side of the tables) having a configuration similar to Applicant's reactor. Specific dimensions for this reactor, however, are not cited in the reference. Rowe and Schatz are further presented to illustrate the state of the art.

* * *

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung
April 29, 2005

Hien Tran

HIEN TRAN
PRIMARY EXAMINER